



features to discuss them all here. The facilities include maths channel connections with data loggers, compatibility with data formats such as the HED files used by 2D and so on. MotoSPEC offer a 30 day free trial so check it out for yourself.

One thing is certain, once you get serious about winning, software aids like these become an indispensable part of success.

Dynamic simulation

Dynamic simulation software has been used by top teams operating at world level for some time and is often created in-house. However in recent years it has become more widely available.

What such software does is to 'ride' a computer model of the bike around a given track and see what lap times result. The effect of changes to the bike can then be investigated.

I programmed a very crude version (by today's standards) many years ago and was surprised by how accurate it could be even then. It was certainly useful. The idea may seem ridiculous if you are not into these things so, as with everything else, here's a very brief outline of how it is done.

Above. Fig 5.31 In this screen, MotoSPEC uses the suspension potentiometer facility to compare what happens when a BMW HP4 is in mid-corner, braking, or accelerating. Note the big rise in rear wheel rate under braking because the top out spring in the shock is engaged, and a similar effect for the fork under acceleration. The graphic on the right shows the changes in geometry, top chain line, antisquat and cg location.

Top right. Fig 5.32 In this example the rear wheel position is being changed giving effective swinging arm lengths of 595mm, 602mm and 615mm. Note the corresponding wheelbase changes, but in particular note how the rear spring stiffness has to be changed to keep the rear wheel rate fairly similar in each case.

Bottom right. Fig 5.33 Here, the set-up of three different bikes is being compared. A 2016 Kawasaki ZX10R, a 2018 Ducati Panigale V4 S and a 2017 Suzuki GSXR1000 FIM. The plots show rear wheel rate and the linkage ratio (as shock travel / wheel travel), both against wheel travel. Note how different the results are for each bike as the rear wheel travel increases. (www.motospec.ca)

Note: These are all computer screen images, much reduced at that. Screen images are very low resolution compared to that required for printing so they lack clarity here. On screen, they are excellent.